



# Yoga Intervention for Mental Health and Quality of Life in Bronchial Asthmatic Patients: A Review

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**Abstract.** Asthma is a non communicable obstructive lung disease. It is a condition in which a person's airways become inflamed, narrow, swell, and produce extra mucus, making breathing difficult. After being diagnosed with asthma patients not only suffer from physical symptoms but also mental disorders such as prolonged stress, anxiety disorders, depression, PTSD (Post-traumatic stress disorders), and fear and panic disorders also. Mental disorders of asthma in some cases, may lead to a life-threatening attack and damage their quality of life. In addition, people with mental disorders are often physically and emotionally drained, which may limit their ability to self-manage their asthma. Yoga act as a panacea therapy for them. Yoga is not only a group of some asana, pranayama and meditation but, it is a complete mind-body intervention and holistic approach towards life. During yoga, slow and deep breathing calms the mind, increases self awareness and gives stability. Yoga therapy may help to balance the autonomic nervous system and may decrease sympathetic activity and increases parasympathetic arousal, which relaxes the body and mind. So, in this way, yoga helps to decrease the level of stress, anxiety, depression, fear and another kind of mental and behavioural disorders and gives better quality of life. Overall yoga helps to increase mental well being and improve the quality of life among bronchial asthmatic patients in a holistic way. The present paper is a systematic review based on the role of yoga for mental health and the level of Quality of Life among Bronchial Asthmatic Patients.

**Keywords.** Anxiety, Bronchial asthma, Depression, Mental health, Quality of life, Stress, Yoga

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## Introduction

Asthma was recognized as early as Ancient Egypt. The word "asthma" is from the Greek word *ásthma*, which means "panting" [1]. Asthma is a most common lung disorder in which inflammation causes the bronchi to swell and narrow the airways, resulting in mild to life-threatening breathing difficulties. Shortness of breath, coughing, wheezing, and chest tightness are some of the symptoms. Asthma is also called bronchial asthma a medical condition that causes the lungs' airway path to become swell and narrow. Because of the swelling, the airway produces excess mucus, making breathing difficult, resulting in coughing, shortness of breath, and wheezing. The disease is chronic and interferes with day-to-day activities. The disease is curable and inhalers aid in the treatment of asthma attacks. Bronchial Asthma can affect people of any age or gender and is caused by a variety of environmental and hereditary factors [2]. So, Asthma is characterised by inflammation of the bronchial tubes, as well as extra sticky secretions within the tubes. In three major signs of asthma, the first one is an airway obstruction that is when one breathes normally, the muscle bands around his airways and allows air to flow freely. When a person has asthma, however, his muscles become tight. It is more difficult for air to pass through. The second one is inflammation. Asthma causes the bronchial tubes in the lungs to become red and swollen. This inflammation can harm the lungs. Treating this is critical to long-term asthma management. The third one is irritation of the airways. Asthmatics have sensitive airways that tend to overreact and narrow when even minor triggers are present. Some symptoms included in asthma such as coughing especially at night or in the morning, wheezing, a whistling sound when a person breathes, shortness of breath, tightness, pain, or pressure in the chest, trouble in sleeping because of breathing problems other symptoms like severe wheezing on inhalation and exhalation, coughing that won't stop, breathing that's too fast, pain or pressure in the chest, retractions are tense muscles in the neck and chest, talking is difficult, anxiety or panic attacks, the

becomes pale and sweaty, lips or fingernails becomes blue. [3]. Stress is the root cause of every disease. Asthma can be triggered by strong emotions, stress, anxiety and depression. There is evidence that there is a connection between asthma, anxiety, and depression. Other emotions such as anger, fear, excitement, yelling and crying can also trigger asthma [4]. After being diagnosed with asthma people suffer from mental disorders such as stress, anxiety, depression, mood disorders, low self-image, panic disorders and other mental and behavioural disorders [5]. Steroid medicine plays an important role to affect mental health. People with severe steroid-dependent asthma have significantly higher levels of anxiety and depression than those with non-steroid-dependent severe asthma or mild-moderate asthma. A recent study discovered that individuals with steroid-dependent severe asthma had 3.5 times more depression symptoms and 2 times more anxiety symptoms than non-steroid dependent people. [6].

According to several clinical studies asthmatic patients have higher rates of depressive and anxiety symptoms than healthy controls. Asthma is also linked to an increased risk of suicidal ideation [7]. Zielinski et al.(2000) conducted a literature search in 2000 and reviewed eight studies on the prevalence of depressive symptoms in children and adults with asthma. As per all eight studies the depressive symptoms were more common in children and adults with asthma than in the general population. Adolescents and young adults have similar higher rates of depressive and anxiety disorders [8]. Goodwin et al.(2004) investigated the likelihood of depressive and anxiety disorders in a birth cohort of over 1,000 young people with asthma who were followed up to the age of 21. Using the Composite International Diagnostic Interview, participants between the ages of 18 and 21 were asked about their experience with depressive and anxiety symptoms since the previous assessment. Adolescent and young adult asthma were linked to an increased risk of major depression, panic attacks, and many anxiety disorder [9]. In another study by Goodwin et.al (2005) in their study, 74 patients aged 5 to 11 years old,

were screened for mental disorders in the waiting room of an inner-city asthma clinic using the National Health's Diagnostic Interview Schedule for Children (DISC) Predictive Scale (DPS). They discovered that nearly 26% of patients had a probable depressive or anxiety disorder [10]. Morrison et al.(2002) studied 46 patients ranging in age from 6 to 17 years who presented to the Children's Medical Center Asthma Clinic, which primarily serves children from low-income families and found that eighty-six per cent of the children were taking medium or high doses of inhaled corticosteroids for their asthma [11]. Goodwin et al.(2007) found that adults with obstructive lung disease had significantly lower scores on the overall General Well-Being scale and higher odds of depressive symptoms compared to subjects with no lung function abnormalities [12]. Lavoie et al.(2006) used spirometry to confirm the diagnosis of asthma and discovered that rates of depressive and anxiety disorders in asthmatic adults (20% and 23%, respectively) were twice as high as in the general population [13]. Richardson et al. (2006), studied a large population-based sample of 767 asthmatic adolescents aged 11 to 17 years and discovered that those with an anxiety or depressive disorder reported significantly more asthmatic symptoms in the previous two weeks than those who are without anxiety or depressive disorders. Youth with one DSM-IV anxiety and depressive disorder along with asthma had significantly more asthmatic symptoms in the previous two weeks than those with asthma alone [14]. Rimington et al.(2001) used the Hospital Anxiety and Depression (HAD) scale to assess the effect of anxiety and depression on the symptoms of asthma as measured by the Asthma Quality of Life Questionnaire (AQLQ) in 114 adults from general practitioner practices. Anxiety and depression were found to be strongly associated with the severity of asthma symptoms [15]. Martinez-Moragon et al.(2003), used spirometry, dyspnea scales, and the Beck Depression Inventory (BDI) to investigate possible determinants of dyspnea in 153 adult asthma patients with varying levels of severity. Patients had more dyspnea when they had higher levels of anxiety and depressive symptoms, regard-

less of the severity of the obstruction [16]. Solis et al.(2006), gathered information from patients suffering from both asthma and major depression. They discovered that asthma preceded the onset of the first depressive symptoms in 62% of patients, depression preceded asthma in 24%, and both appeared at the same time in 14% of participants [17]. Scott et al. (2007), found that, compared with those without asthma, people with asthma were approximately 1.6 times more likely to have a depressive disorder, and approximately 1.5 times more likely to have an anxiety disorder [18]. Delmas et al. (2011), investigated and found that the population studies have shown a higher prevalence of major depressive episodes among adolescents with asthma than adolescents without asthma [19]. Yorke et al. (2007) showed that, depression and anxiety disorders are common among people with severe asthma and may be either a consequence of or a contributor to asthma. As per the studies of Goodwin et al. (2013), they reported that there is a positive correlation between the risk of mental health problems and asthma severity in children and adolescents and also having poor quality of life [20]. For people with asthma, who have mental disorders symptoms were associated with poorer asthma-related health status, greater severity of asthma, poorer asthma-specific quality of life, and poorer physical health status [21].

Yoga originated from the Sanskrit word, 'yuj', which means union of the soul with Supersoul. It is a collection of physical, mental, and spiritual applications or disciplines that originated in ancient India to regulate and still the mind, recognising a detached witness-consciousness unaffected by the mind (Chitta) and mundane pain (Dukha) [22]. Yoga offers physical flexibility, strength, mental peace and gives complete relaxation. It makes harmony between body, mind and soul. It gives holistic well being [23]. Daily yoga practice improves mental clarity and calmness, raises body awareness, improves chronic stress network, calms down the mind, centres attention, and improves concentration. The combination of meditation and breathing into yoga can help improve a person's

mental health [24].

Yoga seems to decrease and reduce the excitability of the nervous system. Pranayama helps to decrease anxiety, pulse rate, urinary catecholamine concentration, urinary cholinesterase activity, and depression. According to Gothe et al.(2019), yoga helps to increase alpha synchrony which points to its stabilising effect on the nervous system. MRI (Magnetic Resonance Imaging) shows that systematic practice of yoga makes the cerebral cortex (the area of the brain responsible for information processing) and hippocampus (the area of the brain responsible for learning and memory) thick which may counteract age-related declines in memory and other cognitive skills [25]. Yoga may increase GABA (Gamma-AminoButyric Acid), which is connected with better mood and decreased anxiety. Meditation also reduces activity in the limbic system. That helps to decrease emotional sensitivity. Yoga decrease the level of stress hormone called cortisol. So, it reduces stress and post-traumatic stress disorder. Yoga aids in the reduction of disturbing memories and emotional arousal as well as the produces the calmer and steadier breathing. Because it activates the parasympathetic nervous system deep and slow breathing is connected with calmer states. Hence, yoga appears to have a stabilising effect on bronchial reactivity, making the vagal efferents less excitable, enlightening mental health and responsible for a better quality of life among bronchial asthmatic patients [26].

## Yoga for the improvement of mental health and quality of life among bronchial asthmatic patients

Here, this is a review based on the role of yoga for the improvement of mental health and quality of life among bronchial asthmatic patients.

According to Amuthadevi et al. (2020), after 8 weeks of yoga practice the PEFR(Peak Expiratory Flow Rate) was significantly increased( $p < 0.05$  level) while the stress level was significantly decreased (at  $P < 0.05$  level) among

15 adult bronchial asthmatic women. Yoga also helps to improve the quality of life among asthmatic patients [27].

According to Singh et al. (2012), after 50 minutes of yoga practice for two months the lungs functions Transfer factor of the lung for carbon monoxide-TLCO (ml/mm Hg/min), Forced Vital Capacity - FVC, Forced Expiratory Volume in the first second – FEV1, Ratio of FEV1/FVC (%) expressed in percentage, Peak Expiratory Flow Rate – PEFR (l/sec), Maximum Voluntary Ventilation – MVV (l/min), Slow vital capacity – SVC were significantly increased (at  $P < 0.001$ ). Asthma Quality of Life measured by the Asthma Quality of Life Questionnaire (AQLQ) was significantly improved (at  $P < 0.001$  level) in the yoga group among 30 bronchial asthmatic patients [28].

According to Bidwell et al. (2012), after 10 weeks of yoga training the quality of life was significantly improved (at  $p < 0.05$ ) and the heart rate variability was significantly decreased (at  $p < 0.05$ ) among 19 females diagnosed with bronchial asthma [29].

Turan and Tan, M. (2020), found that after 6 weeks of yoga intervention the respiratory functions and asthma control symptoms were significantly increased ( at  $p < 0.05$  level) and quality of life was significantly improved and asthma related quality of life was measured by the Asthma Quality of Life Scale (AQLQ) was significantly improved (at  $p < 0.05$  level) in yoga group among 56 asthmatic patients [30].

Vempati et al. (2009), found that after two months of yoga practices, forced expiratory volume (FEV1) at 8 wk, and peak expiratory flow rate (PEFR) were significantly increased (at  $P < 0.05$  level) while exercise-induced bronchoconstriction (EIB) or exercise tolerance capacity was significantly decreased (at  $P < 0.05$  level), also there were a minimum significant improvement in Asthma Quality of Life (AQOL) scores in yoga group among 57 adults with mild to moderate bronchial asthma [31].

According to Yüce and Taşçı, (2020), after one month of yoga practice asthma control test, pulmonary function test and quality of life measured by Asthma Quality of Life Questionnaire

(AQLQ) were significantly increased ( $p < 0.05$ ) among yoga group in bronchial asthmatic patients [32].

Malarvizhi (2019), showed that after the six months of yoga intervention in asthma quality of life asthma symptoms ( $P < 0.001$ ), functional limitations ( $P < 0.001$ ), emotional functions ( $P < 0.001$ ) and environmental stimuli ( $P < 0.001$ ) is improved and also showed a significant improvement among 125 adults patients in the yoga group compared to control [33].

Prem et. al(2012), in their studies concluded that the Buteyko group showed better trends of improvement in the Asthma Quality of Life Questionnaire than the pranayama ( $p < 0.05$  level) and control groups ( $p < 0.0001$ ), however 5 days of pranayama shows significant improvement in quality of life ( $P < 0.05$  level) among 40 patients than the control group [34].

According to Kant and Agnihotril (2013) they showed that after six months of yoga practice, the asthma quality of life scores was highly significantly increased (at  $P < 0.0001$  level) among 121 asthmatic patients than in the control group [35].

According to Saguil, A. (2017), they showed that after yoga practices the quality of life of asthma was significantly increased (at  $p < 0.05$  level) and decreased medication use (at  $p < 0.05$  level) among 1048 patients in 15 randomized controlled trial studies [36].

According to Cramer et. al. (2014), the quality of life ( $p < 0.001$ ), (PEFR) Peak expiratory Flow rate ( $p < 0.001$ ) and (FEV1) forced expiratory volume in one second ( $P < 0.01$ ) and forced vital capacity ( $p < 0.001$ ) were significantly increased while asthma symptoms were significantly decreased ( $< 0.001$ ) among 824 asthmatic patients in 14 randomized controlled trials [37].

Agnihotri et. al. (2017), found that after 6 months of yoga practice asthma quality of life was significantly increased ( $P < 0.0001$ ) among 125 participants [38].

The another study by Agnihotri and Kant (2020) reported that after eight months of yoga practices there was a significant reduction on the level of stress ( $p < 0.0001$  level), anxiety ( $P < 0.05$  level) and depression ( $P < 0.001$  level)

in yoga group among 150 bronchial asthmatic patients [39]. Hence, yoga has shown significant improvement on mental health and quality of life among bronchial asthmatic patients.

## Discussion

Yoga relaxes the skeletal muscle, increases chest expansion, enhances the breath holding time also relaxes the skeletal muscle and peak inspiratory flow rate. Which leads to overall mental well-being [40]. It reduces sympathetic activity and responses which are similar to 'Relaxation Response'. Yoga when combined together with meditation produced maximum effects on sympathetic autonomic actions [41]. Pranayama may have psychophysiological benefits by increasing the patient's sense of the control over stress, which aids in the reduction on the stress level [28].

Yoga maintains autonomic balance with a tendency for parasympathetic behaviour rather than stress-induced dominance sympathetic hegemony. Yoga as a therapy controls and rebalances the autonomic nervous system, increases the rate of breathing and gives rest to the voluntary inhalation and exhalation muscles resulting in a decreased sympathetic hypersensitivity which results in decreased prolonged stress, fear, anxiety and panic attack [42]. Meditation, an essential component of yoga, may even assist practitioners in attaining a state of complete mental silence, which yoga advocates regard as an innately therapeutic process beneficial to people suffering from chronic diseases such as asthma [43]. So, yoga is an effective tool to treat various psychological disorders, and improve the status and also the quality of life of asthmatic patients. Therefore, it can be practised as an adjuvant therapy with standard medical treatment [35].

## Conclusion

The yogic intervention has shown significant improvement to increase the level of mental health and quality of life among bronchial asthmatic patients. Yoga preserves autonomic homeostasis by favouring parasympathetic dominance over sympathetic dominance brought on

by stress [42]. Yoga increases parasympathetic activity, encourage physical and mental relaxation, also helps to increase self awareness and relieves tension [45]. Yoga can reduce efferent vagal reactivity, which has been identified as a mediator of the psychosomatic factor in asthma, by reducing psychological hyperactivity and emotional sensitivity [45]. Regular practice of Yoga is good to achieve complete physical, mental social and spiritual health. It provides relaxation of the mind, energizes the body and improves the quality of life of asthmatic patients. Yogic practices on asthmatic patients create a significant degree of relaxation, a positive attitude toward asthma and exercise tolerance [38]. Hence, yoga helps to improve mental health and quality of life among bronchial asthmatic patients.

**Compliance with ethical standards** Not required.

**Conflict of interest** The authors declare that they have no conflict of interest.

## References

- [1] Using Your Inhaler: Keep Your Asthma In Check | Murphy's Chemist [Internet]. [cited 2022 Jun 7]. Available from: <https://www.murphyschemist.co.uk/using-your-inhaler/>
- [2] Asthma - Symptoms and causes - Mayo Clinic [Internet]. [cited 2022 Jun 7]. Available from: <https://www.mayoclinic.org/diseases-conditions/asthma/symptoms-causes/syc-20369653>
- [3] Asthma: Causes, Symptoms, Diagnosis, Treatment [Internet]. [cited 2022 Jun 7]. Available from: <https://www.webmd.com/asthma/what-is-asthma>
- [4] Shastri VV, Hankey A, Sharma B, Patra S. Investigation of Yoga Pranayama and Vedic Mathematics on Mindfulness, Aggression and Emotion Regulation. *Int J Yoga*. 2017;10(3):138. <https://doi.org/10.4103/0973-6131.213470>
- [5] Asthma UK | Wellbeing for people with severe asthma [Internet]. [cited 2022 Jun 8]. Available from: <https://www.asthma.org.uk/advice/severe-asthma/making-life-easier-with-severe-asthma/mental-health-severe-asthma/>
- [6] Amelink M, Hashimoto S, Spinhoven P, Pasma HR, Sterk PJ, Bel EH, et al. Anxiety, depression and personality traits in severe, prednisone-dependent asthma. *Respir Med*. 2014;108(3):438-44. <https://doi.org/10.1016/j.rmed.2013.12.012>
- [7] Kewalramani A, Bollinger ME, Postolache TT. Asthma and Mood Disorders. *Int J Child Health Hum Dev*. 2008;1(2):115. Available from: </pmc/articles/PMC2631932/>
- [8] Zielinski TA, Sherwood Brown E, Nejtek VA, Khan DA, Moore JJ, John Rush A. Depression in Asthma: Prevalence and Clinical Implications. *Prim Care Companion J Clin Psychiatry*. 2000;2(5):153-8. <https://doi.org/10.4088/PCC.v02n0501>
- [9] Goodwin RD, Fergusson DM, Horwood LJ. Asthma and depressive and anxiety disorders among young persons in the community. *Psychol Med*. 2004;34(8):1465-74. <https://doi.org/10.1017/S0033291704002739>
- [10] Goodwin RD, Messineo K, Bregante A, Hoven CW, Kairam R. Prevalence of probable mental disorders among pediatric asthma patients in an inner-city clinic. *J Asthma*. 2005;42(8):643-7. <https://doi.org/10.1080/02770900500264770>
- [11] Morrison KM, Goli A, Van Wagoner J, Sherwood Brown E, Khan DA. Depressive Symptoms in Inner-City Children With Asthma. *Prim Care Companion J Clin Psychiatry*. 2002;4(5):174. <https://doi.org/10.4088/PCC.v04n0501>
- [12] Goodwin RD, Chuang S, Simuro N, Davies M, Pine DS. Association between lung function and mental health problems among adults in the United States: findings from the First National Health and Nutrition Examination Survey. *Am J Epidemiol*. 2007;165(4):383-8. <https://doi.org/10.1093/aje/kwk026>
- [13] Lavoie KL, Bacon SL, Barone S, Cartier A, Ditto B, Labrecque M. What is worse for asthma control and quality of life: depressive disorders, anxiety disorders, or both? *Chest*. 2006;130(4):1039-47. <https://doi.org/10.1378/chest.130.4.1039>
- [14] Richardson LP, Lozano P, Russo J, McCauley E, Bush T, Katon W. Asthma symptom burden: relationship to asthma severity and anxiety and depression symptoms. *Pediatrics*. 2006;118(3):1042-51. <https://doi.org/10.1542/peds.2006-0249>
- [15] Rimington LD, Davies DH, Lowe D, Pearson MG. Relationship between anxiety, depression, and morbidity in adult asthma patients. *Thorax*. 2001;56(4):266. <https://doi.org/10.1136/thorax.56.4.266>
- [16] Martínez-Moragón E, Perpiñá M, Belloch A, De Diego A, Martínez-Francés M. Determinants of dyspnea in patients with different grades of stable asthma. *J Asthma*. 2003;40(4):375-82. <https://doi.org/10.1081/JAS-120018637>
- [17] Solis OL, Khan DA, Brown ES. Age at onset of major depression in inner-city adults with asthma. *Psychosomatics*. 2006;47(4):330-2. <https://doi.org/10.1176/appi.psy.47.4.330>
- [18] Scott KM, Von Korff M, Ormel J, Zhang M yuan, Bruffaerts R, Alonso J, et al. Mental Disorders among Adults with Asthma: Results from the World Mental Health Surveys. *Gen Hosp Psychiatry*. 2007;29(2):123. <https://doi.org/10.1016/j.genhosppsy.2006.12.006>
- [19] Delmas MC, Guignon N, Chan Chee C, Fuhrman C, Herbet JB, Gonzalez L. Asthma and major depressive episode in adolescents in France. *J Asthma*. 2011;48(6):640-6. <https://doi.org/10.3109/02770903.2011.585410>

- [20] Goodwin RD, Robinson M, Sly PD, McKeague IW, Susser ES, Zubrick SR, et al. Severity and persistence of asthma and mental health: a birth cohort study. *Psychol Med.* 2013;43(6):1313-22. <https://doi.org/10.1017/S0033291712001754>
- [21] Kewalramani A, Bollinger ME, Postolache TT. Asthma and Mood Disorders. *Int J Child Health Hum Dev.* 2008;1(2):115. Available from: [/pmc/articles/PMC2631932/](https://pubmed.ncbi.nlm.nih.gov/16361932/)
- [22] Yoga - Wikipedia [Internet]. [cited 2022 Mar 7]. Available from: <https://en.wikipedia.org/wiki/Yoga>
- [23] Harmony between Mind, Body and Soul for Holistic Wellbeing - Life and Pursuits [Internet]. [cited 2022 Jun 8]. Available from: <https://www.lifeandpursuits.com/blogs/lap/harmony-between-mind-body-and-soul-for-holistic-wellbeing>
- [24] Benefits of Yoga | American Osteopathic Association [Internet]. [cited 2022 Jun 8]. Available from: <https://osteopathic.org/what-is-osteopathic-medicine/benefits-of-yoga/>
- [25] Gothe NP, Khan I, Hayes J, Erlenbach E, Damoiseaux JS. Yoga Effects on Brain Health: A Systematic Review of the Current Literature. *Brain Plast.* 2019;5(1):105. <https://doi.org/10.3233/BPL-190084>
- [26] Yoga for better mental health - Harvard Health [Internet]. [cited 2022 Jun 8]. Available from: <https://www.health.harvard.edu/staying-healthy/yoga-for-better-mental-health>
- [27] Amuthadevi K, Muthulakshmi R, Elangovan R. Effect Of Yoga Therapy On Peak Expiratory Flow Rate And Stress Among Asthmatic Adult Women. *Eur J Mol Clin Med.* 2020;07(09):1075-1082. <https://ejmcm.com/pdf475854f125e9a72e13101cfe5937501acd44.html>
- [28] Singh S, Soni R, Singh KP, Tandon OP. Effect Of Yoga Practices On Pulmonary Function Tests Including Transfer Factor Of Lung For Carbon Monoxide (Tlco) In Asthma Patients. *Indian J Physiol Pharmacol.* 2012;56(1):63-8.
- [29] Bidwell AJ, Yazel B, Davin D, Fairchild TJ, Kanaley JA. Yoga Training Improves Quality of Life in Women with Asthma. 2012;18(8):749-55. <https://doi.org/10.1089/acm.2011.0079>
- [30] Bahçecioglu Turan G, Tan M. The effect of yoga on respiratory functions, symptom control and life quality of asthma patients: A randomized controlled study. *Complementary Therapies in Clinical Practice* 2020;38:101070. <https://doi.org/10.1016/j.ctcp.2019.101070>.
- [31] Vempati R, Bijlani RL, Deepak KK. The efficacy of a comprehensive lifestyle modification programme based on yoga in the management of bronchial asthma: a randomized controlled trial. *BMC Pulm Med* 2009;9. <https://doi.org/10.1186/1471-2466-9-37>.
- [32] Erdoğan Yüce G, Taşçı S. Effect of pranayama breathing technique on asthma control, pulmonary function, and quality of life: A single-blind, randomized, controlled trial. *Complementary Therapies in Clinical Practice* 2020;38:101081. <https://doi.org/10.1016/j.ctcp.2019.101081>
- [33] M. M, K. M, M. B, B. H. Effect of 6 months of yoga practice on quality of life among patients with asthma: A randomized control trial. *Adv Integr Med.* 2019;6(4):163-6. <https://doi.org/10.1016/j.aimed.2018.12.001>
- [34] Prem V, Sahoo RC, Adhikari P. Comparison of the effects of Buteyko and pranayama breathing techniques on quality of life in patients with asthma – a randomized controlled trial. *Clin Rehabil* 2012;27:133–41. <https://doi.org/10.1177/0269215512450521>.
- [35] Kant S, Agnihotri S. Asthma diagnosis and treatment – 1029. Yoga as an adjuvant therapy in asthma management. *World Allergy Organization Journal* 2013;6:P28. <https://doi.org/10.1186/1939-4551-6-s1-p28>.
- [36] Physician AS-AF, 2017 undefined. Effects of yoga in patients with asthma. *aafp.org* [Internet]. [cited 2022 Jun 8]; Available from: <https://www.aafp.org/afp/2017/0801/p159>
- [37] Cramer H, Posadzki P, Dobos G, Langhorst J. Yoga for asthma: a systematic review and meta-analysis. *Annals of Allergy, Asthma and Immunology* 2014;112:503-510.e5. <https://doi.org/10.1016/j.anai.2014.03.014>.
- [38] Agnihotri S, Kant S, Mishra S, Verma A. Assessment of significance of Yoga on quality of life in asthma patients: A randomized controlled study. *AYU* 2017;38:28. <https://doi.org/10.4103/ayu.ayu316>.
- [39] Agnihotri and Kant. To Evaluate the Impact of Pranayama and Meditation on Psychological Disorders in Patients with Bronchial Asthma. *Dynamics of Human Health (DHH).* 2020;7(2). [https://journalofhealth.co.nz/?page\\_id=2158](https://journalofhealth.co.nz/?page_id=2158)
- [40] Khanam AA, Sachdeva U, Guleria R, Deepak KK. Study of pulmonary and autonomic functions of asthma patients after yoga training. *Indian J Physiol Pharmacol.* 1996;40(4):318-324. <https://www.ijpp.com/IJPParchives/1996404/318-324.pdf>
- [41] Davis MH, Saunders DR, Creer TL, Chai H. Relaxation training facilitated by biofeedback apparatus as a supplemental treatment in bronchial asthma. *J Psychosom Res.* 1973;17(2):121-8. [https://doi.org/10.1016/0022-3999\(73\)90012-3](https://doi.org/10.1016/0022-3999(73)90012-3)
- [42] Sodhi C, Singh S. A study of the effect of yoga training on pulmonary functions in patients with bronchial asthma. *Indian J Physiol Pharmacol.* 2009;53(2):169–174
- [43] Yang ZY, Zhong H Bin, Mao C, Yuan JQ, Huang YF, Wu XY, et al. Yoga for asthma. *Cochrane Database Syst Rev.* 2016 Apr 27;2016(4). <https://doi.org/10.1002/14651858.CD010346.pub2>
- [44] Yoga for Stress: Breath, Poses, and Meditation to Calm Anxiety. [cited 2022 Jun 8]. <https://www.healthline.com/health/fitness/yoga-for-stresshow-it-works>
- [45] Nagarathna R, Ed. Yoga for bronchial asthma: a controlled study. *Br Med J (Clin Res Ed)* 1985;291:1077. <https://doi.org/10.1136/bmj.291.6502.1077>